

RAVE and 24-bit Audio

The CobraNet™ protocol supports audio delivery over the network in word lengths of 16-, 20- or 24-bits. Audio resolution may be user-configurable on a per channel basis, hardware permitting. QSC Audio's RAVE™ products began support of 24-bit audio *delivery* with CobraNet version 2.8.5 firmware. RAVE receivers have supported 24-bit audio since the capability became available with the CobraNet version 2 protocol.

This document describes configuring RAVE transmitters for 24-bit audio delivery.

Requirements

All RAVE products, that ship with CobraNet firmware version 2.8.5, support 24-bit audio I/O. Since version 2.8.5, all RAVE digital to analog converters (DAC), analog to digital converters (ADC), AES receivers and AES transmitters support 24-bit word lengths. However, the sample rate converters on the RAVE 81s and 88s inputs present 20-bit words at their outputs. It should be noted that sample rate conversion is applied to the full 24-bit words driven from the AES receivers but the sample rate converters output 20-bit words. Therefore, configuring a RAVE AES transmitter for 24-bit audio delivery over the network is impractical.

Additionally, configuration of RAVE receivers is not necessary. RAVE receivers present their AES transmitters or DACs with the appropriate word length, as delivered from the network transmitter.

Configuring RAVE transmitters for 24-bit audio delivery requires altering the management interface (MI) variables via software. MI access is provided through a set of simple network management protocol (SNMP) objects. An SNMP application is required to alter the configuration of these objects. The QSC Audio and Peak Audio websites provide pointers to some common SNMP tools available on the market, including a trial version of Mg-Soft's browser application. The user will need some type of SNMP application in order to "set" MI variables and Mg-Soft is a good place to start. The Mg-Soft home page is located at <http://www.mg-soft.com>.

Working with SNMP requires assigning an Internet Protocol (IP) address to the RAVE transmitters. Assignment of IP addresses can be done with Peak Audio's CobraNet Discovery application. Additionally, the user will need the "peakAudio" management information base (MIB) file. The Discovery application and the "peakAudio" MIB are

available for free download from the Peak Audio download website at <http://www.peakaudio.com/Download.html>. The CobraNet Discovery User's Manual can also be viewed from the download site.

** Note: QSC Audio's website provides further information and a tutorial for getting started with SNMP.*

Configuration

The procedure for configuring 24-bit audio is a simple matter of adhering to the Ethernet packet size limitation and altering the "txSubFormat" and "txSubCount" MI variables accordingly. The "txSubFormat" variable determines the bit resolution of each audio channel. The RAVE's default setting for this variable is 20-bit for all 8 channels within a CobraNet bundle. 20-bit is represented in CobraNet version 2.8.5 with the hexadecimal value 54000h. The SNMP application displays this value in decimal as 344064. It should be noted here that older versions of CobraNet left off the two trailing zeros in the hex value. With these older CobraNet versions 20-bit was indicated with 540h, which is displayed in the SNMP application as 1344. If these abridged values are seen in the SNMP application, the RAVE is operating with a version of CobraNet that does not support 24-bit audio delivery.

Table 1 shows the "txSubFormat" MI variable and values for all audio word lengths supported with CobraNet version 2.8.5 in RAVE.

| Resolution | MI hex value | SNMP displayed value |
|-------------------|---------------------|-----------------------------|
| 16-bit | 44000 | 278528 |
| 20-bit | 54000 | 344064 |
| 24-bit | 64000 | 409600 |

Table 1
("txSubFormat" MI variable)

At this point we should discuss the Ethernet packet size limitation. Type II Ethernet supports a payload size of 1500 bytes. Due to this size limitation, some channel configurations are not supported. Some non-supported examples are: 8 channels at 24-bit resolution or 7 channels at 24-bit resolution with an eighth channel at either 16-bit or 20-bit.

The most economical configuration possible is 6 channels at 24-bit resolution, 1 channel at 16-bit resolution and 1 channel at 20-bit resolution. This provides an 8-channel bundle with mostly 24-bit resolution. 7 channels *only* at 24-bit resolution is also possible. The designer can experiment with their requirements, making note of the RAVE error display or dropped bundles when an illegal configuration is present.

When the bundle must be configured for less than 8 channels, the “txSubCount” MI variable must be configured. The RAVE products do not auto-configure the channel count, such as with 7 channels at 24-bit resolution.

Figure 1 shows the “txSubCount” variable configure for 7 audio channels in bundle 1.

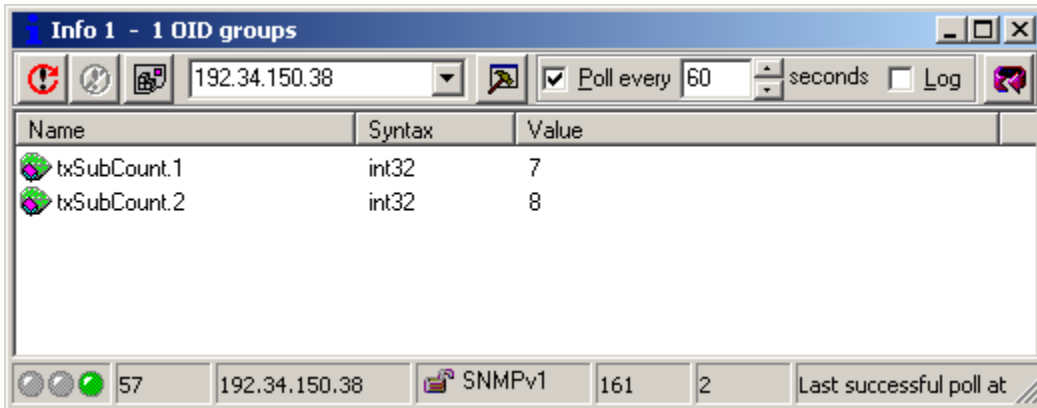


Figure 1
(7 channels in bundle 1)

Figure 2 shows the SNMP application browser view of an 8-channel bundle. 6 channels are configured for 24-bit resolution, 1 channel for 20-bit resolution and 1 channel at 16-bit resolution. The bundle can then be delivered over the network to a RAVE receiver, which will configure its audio output devices appropriately.

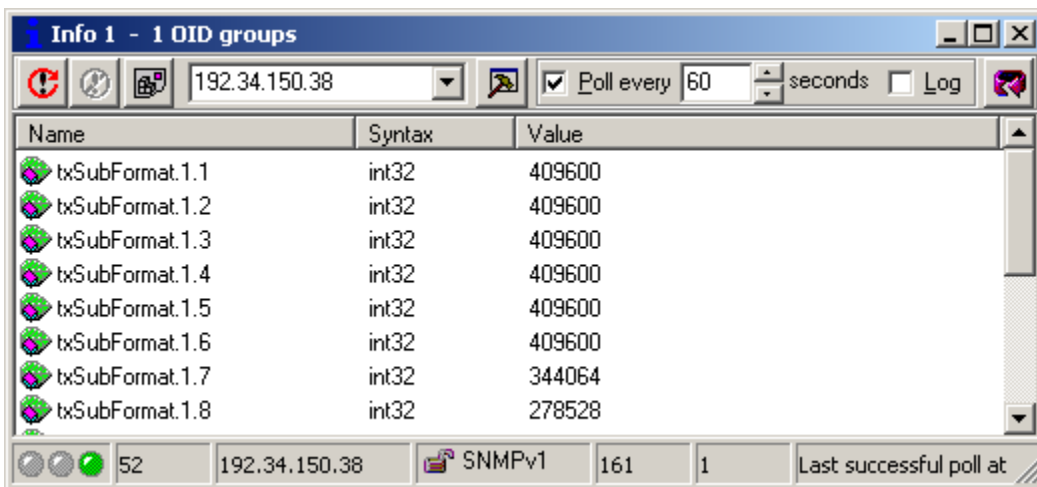


Figure 2
(channel resolution configuration)